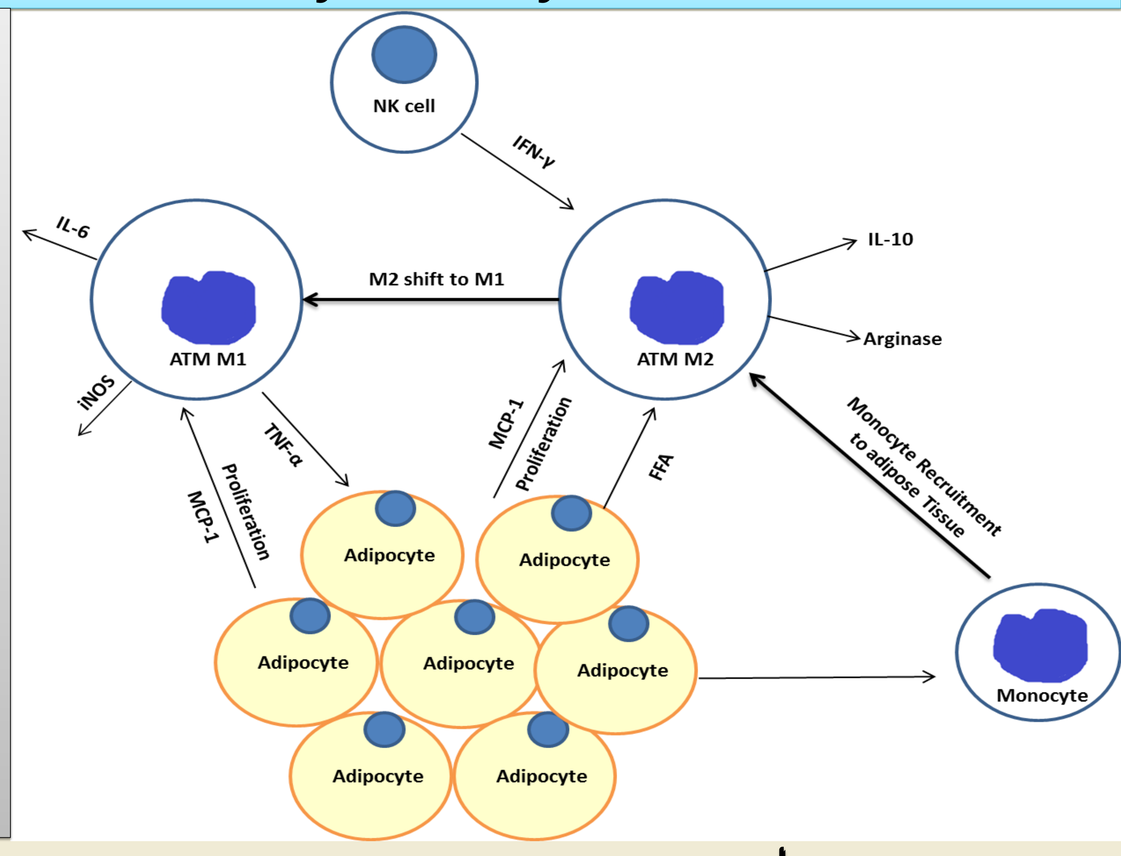
Obesity, Inflamation and Insulin Resistance

Objective This review intends to describe the different mechanisms of insulin resistance and β cell dysfunction caused by obesity.

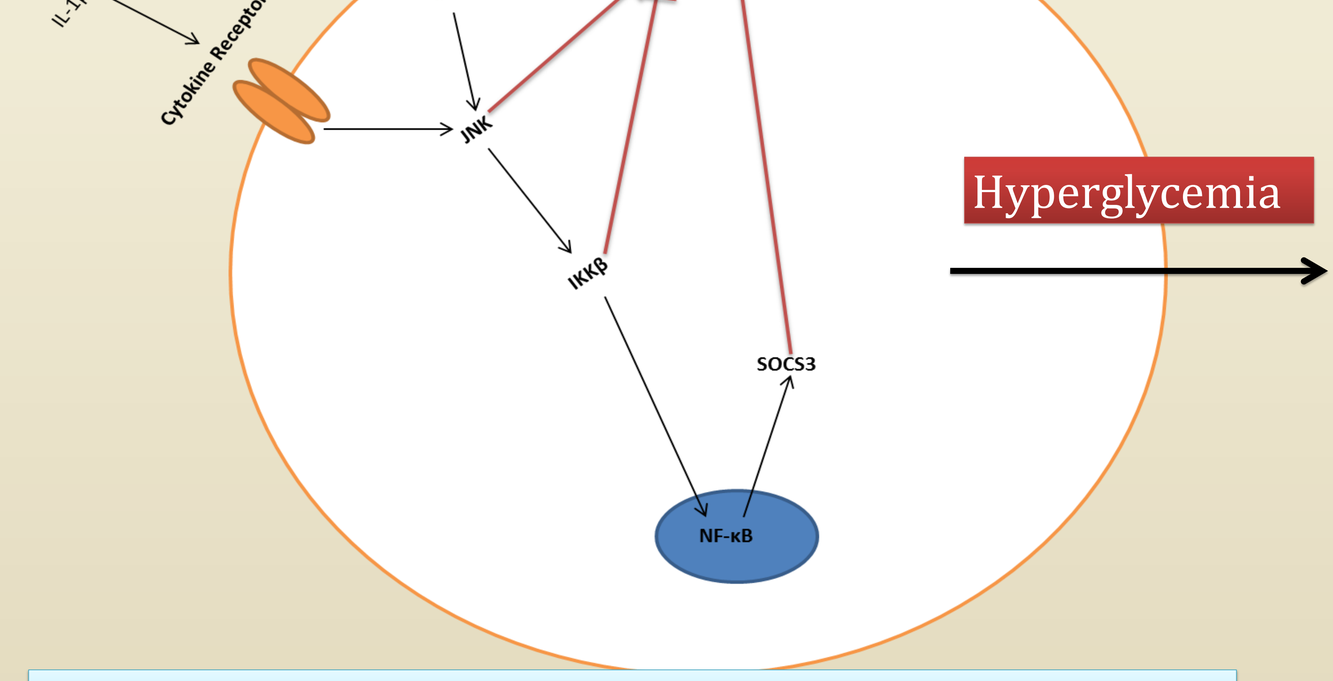
The ATMs: the core of inflamation caused by obesity

Obesity is a condition which has been related to systemic low grade inflamation which is demonstrated by higher blood levels of proinflamatory cytokines like **IL-1β, TNF-α, IL-6** among others.
This inflamation originates in the very same adipose tissue and is caused by Adipose Tissue Macrophages.
Hyperplastic adipocytes cause an increase in pro-inflamatory (IL-6, TNF-α and iNOS expressing) M1, helped by NK cells via secretion of diverse molecules.

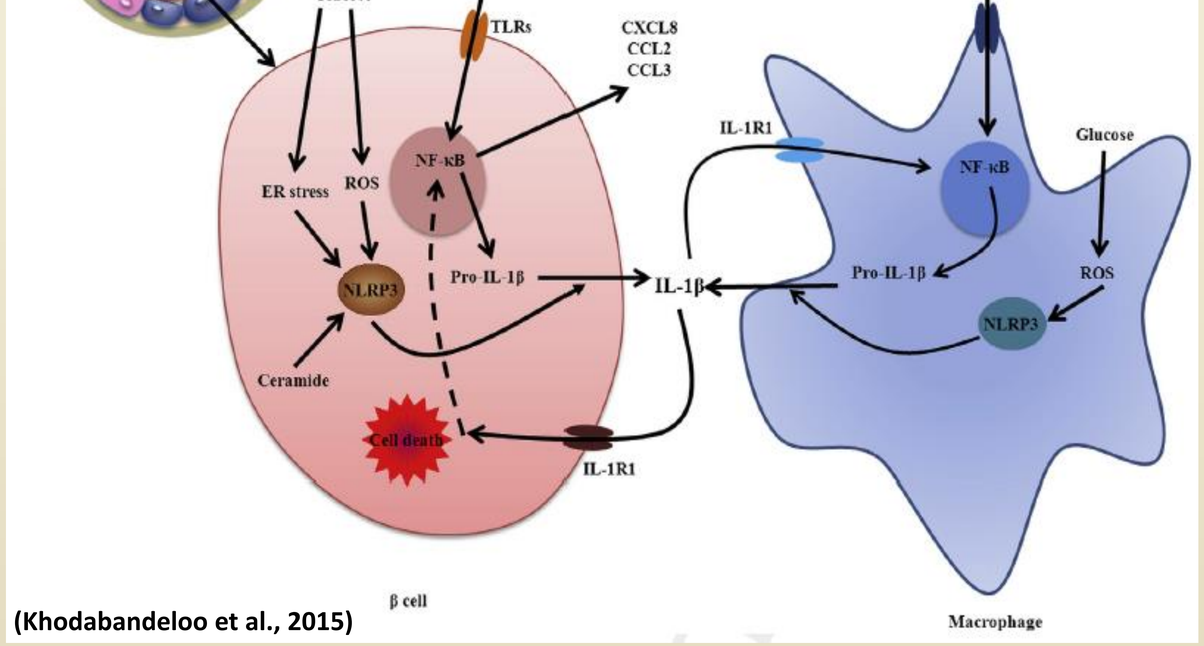
- **FFA:** induce a M1 shift by binding to ATM's TLR-4
- **MCP-1:** recruits monocytes into adipose tissue and induces ATM proliferation
- **IFN-γ (secreted by NK cells):** induces a M1 shift by binding to its receptor in the ATMs



Systemic low grade inflamation and increase in blood FFA



Hyperglycemia



(Khodabandeloo et al., 2015)

FFA and cytokines cause impaired insulin signaling

FFA and cytokines activate **JNK**, **IKKβ** and **SOCS3** among other proteins which inhibit different molecules of the insulin signaling pathway.

FFA and cytokines cause β cell dysfunction

FFA, hyperglycemia and cytokines cause β cell dysfunction and death mainly by causinf ER stress, ROS production which causes death by necrosis and apoptosis by cytochrome c release into the cytoplasm.

Conclusions: Insulin resistance and β cell dysfunction is caused by many different and complex mechanisms many of which remain to be elucidated. Nevertheless investigation about therapeutical targets makes no sense without raising awareness of how harmful obesity can be regarding diabetes, knowing that type 2 diabetes can be prevented by doing excercise and having a healthy lifestyle.

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